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498

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THE TRUE AMERICAN SYSTEM—NO. I.

We are not about to enter upon any political or economical discussion of the principles of free trade, tariffs, or revenue laws, and to disabuse our readers of any such impression we shall state somewhat at length, the object of the present series of papers for which we have chosen the above title, with what propriety will be seen as we proceed.

It is well known that among the natural products of our extensive territory—the animal, vegetable, and mineral kingdoms, furnish many which are wholly or in part peculiar to our own country, and that a large portion of them are well calculated to replace foreign products of similar nature, and in some instances to supersede the latter. Still further it is, or ought to be well known, that there are many articles imported from various countries which not only can easily be raised in the United States, but actually abound in some places and are extirpated or removed with much difficulty. To call the attention of our readers, and all others under whose notice these papers may come, to the vast and untrodden field of inquiry and experiment thus opened to us, is our present object.

We shall in the first number confine ourselves to some preparatory remarks of a general nature, in reference to the importance and necessity of the discussion—and also as to the fitness and propriety of introducing such a subject into this journal.

It will be seen from the early history of our country, that Franklin and other distinguished philofophers who were in correspondence with European *savans*, although devoted to natural science in

one or more of its branches, paid but little attention to the spontaneous productions of the land—although there are at this early period several remarkable exceptions. A very sufficient reason for this neglect is to be found in the unexplored state of the country and the occupation of a large portion of its territory by savage tribes.

The war of the revolution, in itself calculated to draw the minds of men generally from such matters, had however an indirect effect in attracting attention to our indigenous products, which is worthy of notice. Being deprived of many articles of luxury or comfort of foreign production, our active and ingenious forefathers set their wits to work in order to obtain as far as possible substitutes for the luxuries as well as the comforts. That substitutes were found we have sufficient evidence in such names as wild indigo—wild allspice—wild ginger—New Jersey—Oswego—Japan and other teas. Many of these names from their local character have entirely disappeared. Upon the restoration of peace it seems that most of these American products went out of use and were replaced by importations from abroad. It is not pretended that all of the substitutes thus used were of sufficient value to continue in use, but that many were there can be no doubt.

Notwithstanding the observations thus enforced by necessity several circumstances have conspired to divert attention from our indigenous productions. One of the most singular of these, and one which is least thought of, is the result of an old prejudice, that a *new country* is inferior in its natural productions to an *old country*. Absurd as this proposition must appear upon the least reflection, it has not only been defended in various works, but to this day has an indirect effect, now happily rapidly disappearing, in the general preference for foreign articles.

Another of these circumstances is the disappearance and extinction of the Indian tribes formerly inhabiting the Eastern portion of the United States, from whom much valuable information might have been obtained respecting many articles used in food, medicine and domestic manufacture. We are thus left to rediscover by analogy and experiment, the experience of centuries which has perished with this rude but remarkably sagacious race.

Many of the early efforts made to bring to market articles of indigenous product, have failed from the rude and imperfect mode of preparation, which is not occasioned by the high price of labor in this country as is commonly supposed, but from inexperience and want of information respecting the best processes in use elsewhere. This difficulty is likely to be much diminished, if not entirely re-

moved by the increased attention to scientific subjects which so generally prevails throughout the country.

The first fruits of this scientific inquiry which have as yet been gathered are the geological—or more properly speaking—economical surveys of every State in the Union. We conceive the effect of these upon the country at large to be absolutely incalculable. The survey of this State in particular has been conducted upon a magnificent scale, and the very practical nature of the results already obtained, sufficiently justifies the comparatively trifling expense. We have heard it stated that the gentlemen engaged in it are determined to present the information accumulated in their respective departments, in no mean or imperfect form—but to carry out the intentions of the design in a manner calculated to do credit to themselves and to the State.

Considering the fact that these various surveys have been or are soon to be completed, we have thought no time more fitting than the present for bringing this subject to notice, being convinced that the public attention being awakened to the magnitude and usefulness of the knowledge thus accumulated, will be easily directed to the proper mode of carrying it into operation.

One single prudential reason for the multiplication of staples of similar character to those already in use, is alone sufficient to create a vivid interest in this subject. When from failure of crops or other untoward causes, either local or general, any great staple is either diminished in quantity, deteriorated in quality, or falls in price, the effects are felt throughout the Union, and the commercial fluctuations which result are highly detrimental to the national prosperity. For instance, the quantity, quality, and price of the cotton crop, has a yearly effect upon the whole business of the country. Now if, instead of this staple, we had four, five or six of similar nature, and equal value, as we shall presently show that we really may, the diversity of soil, climate and circumstances suited to these various substances, can hardly have such an influence as simultaneously to elevate or depress the price of all of them. The consequence would be a more uniform and healthy current of business, highly favorable to commercial prosperity and the general welfare.

[Translated for the American Railroad Journal.]

OBSERVATIONS UPON THE COMPARATIVE ADVANTAGES AND INCONVENIENCES OF THE EMPLOYMENT OF IRON WIRE, OR BAR IRON, IN THE CONSTRUCTION OF SUSPENSION BRIDGES OF GREAT SPAN.—*By M. Le Blanc*, Chief Engineer of Bridges and Roads.

Cables of iron wire, and chains composed of bars of wrought

iron, may be compared with reference to their economy and their durability.

As regards economy, the question scarcely deserves discussion, and it is easy to prove *a priori* that, in all possible cases, iron wire has the advantage over wrought iron.

In fact, the Council of the *Ponts et Chaussees* has adopted the principle that cables of iron wire should be submitted to a tension of 12 kilogrammes (26½ lbs. nearly) per square millimetre (·0016 sqare inches) of section, but for bar iron, it was decided that this maximum of tension shall not exceed 8 kilogrammes, (17⅔ lbs. nearly).

This principle is founded upon the comparative resistances, of iron wire, No. 18, ordinarily employed in the construction of cables, and of iron bars 3 to 6 centrimetres (1·2 to 2·4 inches) in diameter.

The natural consequence of this principle is, that the section of a chain should be greater by one half than that of a cable, for the same tension, this involves a proportional increase of its weight. In cables of iron wire no joints are used, or at most, but a single one, as in the bridge of Argentat, and this joint made up of two small eyes, weighs but little—on the contrary, they are numerous in chains, and where the system is rather complicated, as I shall prove it should be in bridges of great span, each one of these joints weighs at least 140 kilogrammes, (309 lbs. nearly). On the supposition that the suspension rods are 1·2 metre apart, (47¼ inches,) as there is a joint for each rod, there will be 233 kilogrammes (92·600 lbs. nearly) for a bridge of 180 metres span. This additional weight, together with that of the bars themselves, which, as we have just seen is one half greater than that of the cables, produces an excess of tension which must again be resisted, whence there arises a new increase of section, and consequently of weight in the chains. In applying these principles to individual cases, it is found that the weight of the unit of length of a system of chains exceeds double that of a system of cables.* Now, as the price of iron wire is once and a half that of bar iron, it is plain that the use of iron wire is more economical than that of wrought iron.

I have proved that the total tension is much greater when chains are used, it follows that greater strength must be given to the moorings and to the intermediate piers when the bridges have several openings or bays—a new cause of increase of expense.†

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* In the comparative proposals which I presented for the bridge of Roche Bernard, I showed that these weights are in the proportion of 11 to 25; in order to replace 11 kilogrammes of iron wire which at 1 f. 50c. cost 16 francs 50 cen., we must employ 25 kilogrammes of wrought iron with 25 francs

† In bridges of several bays the cables or chains should be fixed to the intermediate piers n order to avoid the great changes of form which result from unequal loads upon the

It appears to us to have been thus thoroughly proved that in regard to economy, the cables of iron wire are superior to chains of wrought iron.

Let us now compare the two systems in relation to their durability.

The principal objections which have been made to the employment of iron wires are the following:

1st. They offer greater chances for rapid oxidation.

2nd. The imperfection of the present process for manufacturing the cables does not allow us to give an equal tension to all the wires, so that when the cables are raised to their places, the wires which are under most tension have to support many pounds in excess—while those under least tension do not draw at all.

3rd. Cables form a system less rigid than chains of wrought iron do, so that the horizontal oscillations of the roadway are more considerable in the former than in the latter case.

I believe that I have not withheld any of the objections urged against the employment of iron wire, nor weakened those I have presented. I shall now examine them in order.

First objection.—They offer a much greater chance for oxidation.

It is certain that if we expose to alternations of dryness and humidity a bar of iron and a certain number of isolated wires, the sum total of their individual sections being equal to that of the bar, the surface attacked will be far greater in the wires, and in them the oxidation will be most rapid.

In confining ourselves to this general *fact*, without reference to any of the means employed by art for retarding this oxidation, it will be well to examine if even this inconvenience of the more rapid destruction of the cables, is not more than counterbalanced by the advantages which they present.

It is very evident that if the cables remain only forty years without being renewed while the chains may last for sixty or one hundred years, we must calculate what will be the amount at the end of forty years of the sum saved by the use of iron wire instead of bar iron.

To render this more plain, I will give an example. I suppose that a given suspension bridge requires 200,000 kilogrammes of iron, (which was nearly the quantity for the bridge of Roche Bernard).

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two bays, if the chains and cables can slide freely over the top of the piers. Because these piers have to resist only the difference of the tractions produced by different additional loads upon the two bays, it would appear at first sight a matter of indifference whether the permanent loads which are in equilibrio, are greater or less, nevertheless it is plain that the less these permanent loads are, the better the piers are in condition to resist the maximum load of one bay, the other being destroyed—it is then not unimportant that we diminish the permanent load as much as possible.

The expense of the system of suspensions, -	300,000 francs.
According to note (1) to replace the iron wire there must be used 454,545 kilogrammes of wrought iron, which would cost - -	454,545
Saving in favor of iron wire,	154,545 francs.

Now this sum put at interest, will amount at the end of twenty-three years, to 475,506 francs, and supposing that the cables must be entirely renewed at this time, there will still remain a surplus of 175,596 francs, which will be more than sufficient to produce at the end of another twenty-three years, a new capital equal to the cost of the system of suspension.

In the case which we have considered, cables of iron wire lasting but twenty-three years will then be preferable to chains of indefinite duration.

The supposition that isolated wires will last twenty-three years without the necessity of being renewed is not without foundation—and we shall produce a fact which strongly tends to confirm it.

M. Mongolfier, jr., having learned that a grating of iron wire from the church of St. Martin's at Paris was about being taken down, after having remained forty years without any repair, had the curiosity to prove these wires, after having carefully ascertained their number, and he was convinced that they had lost but one-fifth of their entire strength.‡

This loss of strength is not sufficient to require a complete renewal of the system of cables.

But the most determined opponents of the use of iron wire confess that cables do not afford such facilities for oxidation as detached wires. The greasy substance which covers them affords a powerful preventive to rust—their union preserves them in the interior more or less, from moist air, the ligatures are a stil lfurther obstacle to its introduction, and finally the carefull superintendence which should be given, are all reasonable motives for hoping that the effects of oxidation may be diminished in a remarkable manner.

It may be objected that experience has not fully confirmed the opinion, however probable it may be, that cables are less susceptible the attacks of oxidation than iron wires. I confess that no one fact can as yet, incontestably, prove the justice of this opinion, but there are several which we can produce, capable of giving much strength to it.

The bridge of Tournon has been in existence eleven years, but no

‡ The increase of oxidation is not as rapid as would be supposed from the first observations made—for the first layer of rust which covers the surface of a bar of iron instead of favoring this oxidation proves a coating which is an obstacle to it.

very considerable trace of oxidation has manifested itself, at least to my observation, upon the surface of the cables, and if there existed any in the interior it would not have failed to show itself by a brownish stain upon the outside of the paint which covers them.

A bridge of iron wire was built at Brest in 1526, the cables exposed to the salt air which attacks iron with so much energy should have undergone a remarkable deterioration in the space of three years. M. Trotte de la Roche, Chief Engineer, who, on account of the plans adopted for the port, was obliged to dismount it, took the pains at the invitation of M. Inspector General Lamblardie, to prepare a *process verbal* of the state in which he found the cables.

It appears from the *process verbal*, 1st. That the continuous ligature which covered the cables, was slightly attacked, but that by the first scratch of the file, the oxidized portion was removed. 2nd. That the exterior wires of the cables showed slight traces of oxidation, but that the slightest scratch of the file caused them to disappear. (M. Trotte de la Roche supposes that the oxide was only deposited upon the wires of the cables, and that it came from the ligatures. 3rd. That the interior wires were perfectly untouched.

Eight years is a short space of time, but if we consider that the effects of oxidation probably continue to decrease, we may conclude that they are not so very rapid, and that the fears entertained upon this point are greatly exaggerated.

An observation has been made which is worthy of remark—it is that in chains the surface of the bars, which is attacked by oxidation, proves the portion of them offering the most resistance, while in a cable the interior portions have the same strength with the others.

(Concluded in next number.)

NEW INVENTION—SUBSTITUTE FOR HAIR MATRESSES.

A friend has placed upon our table a very handsome article intended as a substitute for hair in beds. Its appearance is that of a very neat curl of some substance rather smaller than fine cord, the touch and smell are at once calculated to command favor and give it the superiority over hair. In fact it is a preparation from bass and other kinds of wood, and is the product of a machine invented by Mr. Baker of Utica—late Canal Commissioner.

We understand that the article is in great demand and that Mr. Baker manufactures large quantities of it at Utica. We hope that a supply will be sent this way or that Mr. Baker will operate with his machine somewhere in or near New York. The present oppressive weather is sufficient to drive the most obstinate adherent

to feather beds, from off such a mass of semi-decaying animal matter—even if he is salamander enough to stand the heat, his olfactories could hardly endure the close and disagreeable order. In fact feathers are neither wholesome nor economical, either for summer or winter—hair matresses are costly although very comfortable—but Mr. Baker's substitute has the advantage over all, for it is not only clearly durable and wholesome, but it is *cheap*, and can be afforded at one-fourth the cost of a hair matress.

The following description of a new form of *cast iron* rail, will have considerable interest, as being almost entirely new. The usual objections to rails of this material are obviated by the peculiar form, which seems to confer a certain degree of elasticity, sufficient to prevent fracture.

The great advantage, however, is, that while we are obliged to import rolled iron at high prices, cast iron can be produced in almost every section of the country at a very cheap rate.

In our next number we shall give a cut representing the rail, which could not be finished in time for the present number.

DESCRIPTION OF SPAULDING AND ISHERWOOD'S PATENT CAST IRON RAIL AND SUPERSTRUCTURE.

This rail is intended to be used for the rail and superstructure of railroads, without the auxilliary of wood.

The rail is composed of cast iron, cast whole, with an upper and lower arch, and appropriate flanges. The arches to be united by posts with braces disposed lozengerwise between.

The arches are terminated in an abutting piece at the ends, and the feet tied together by wrought iron rods. The bars are also connected transversly by wrought iron ties. The top of the rail is a horizontal bar with a flange cast under the centre of the bar, and supported by posts above the upper arch, and by braces disposed lozengerwise between them, as shown in the above plan to support the bar and load, and secure the branches of the upper arch. The rails are cast with a tongue and groove joint at the extremities, and fitted at the end into a cast iron chair, which is placed upon the foundations. The foundation may consist of wood or iron piles, stone, brick or wood blocks, or such other materials as may be most convenient.

The general arrangement of the parts is shown in the above drawing. The length of the bars is ten feet, but the length and sizes may both be altered to suit the locality. A piece of this cast iron road is now in operation on the Ithaca and Owego railroad, near the village of Owego. It is daily run over by an eleven ton

locomotive with heavy loads of lumber, plaster, merchandize, etc., and in every respect gives entire satisfaction. The weight of each bar is 250 pounds, and with white oak piles placed ten feet apart longitudinally, can be built for $11,000 per mile inclusive of grading!

Any communication on the subject can be addressed to Ira Spaulding, C. E., Owego, Tioga county, N. Y.

The following prospectus has been sent us with a catalogue of the very excellent and cheap publications of the geographical establishment of Bruxelles. It will be seen that the plan is a novel one—as by it subscribers may secure a complete atlas or the sheets for a globe, 24 feet in diameter.

THE UNIVERSAL ATLAS OF GEOGRAPHY—PHYSICAL, POLITICAL, STATISTICAL AND MINERALOGICAL—*Constructed by Ph. Vander Maelen*, according to the best Charts, Astronomical Observations, and Voyages and Travels.

The science of geography which presents at once the greatest interest and amusements to every class of society, is become at present one of the most essential branches of public instruction. The excellent works which have appeared for a century, the close relations, the voyages, the discoveries, the multiplied and new connections, resulting from the great revolutions which, with the progress of time, necessarily ameliorate the condition of nations, and establish upon new basis their systems of policy and their commercial interest, render the study of geography of the utmost importance to mankind. In order to facilitate that science, it is absolutely necessary to procure charts and maps, without the assistance of which, the attention and the memory are overloaded and uselessly exhausted.

From the ambitious conqueror who would grasp the world to the sagacious diplomatist who breathes only peace; from the severe historian and the indefatigable traveller to the skilful physician and the investigating naturalist; from the simple pilot to the hardy sailor who, throughout the immensity of the ocean, searches for undiscovered countries, geographical science is more or less an indispensable requisite for all. Even the man of the world, whose life is consecrated to pleasure, can hardly have so little self-love as to remain entirely uninformed in conversation, which in the present day embraces all kind of science.

The American revolutions, the independence of the Antilles, the war of India, the extraordinary efforts of the Greeks against the oppressors of that ancient land of genius, of courage and of the fine arts, all the recollections of that classical region, of that fertile and beautiful country, at present the theatre of a deadly struggle between liberty and despotism, can never be matter of indifference: no one can disdain the geographical knowledge of places where events of so great an interest and of such importance are occurring. Such a result cannot be expected from a generation or from

an age so prolific in learned, laborious and intrepid men who advance with gigantic strides towards the improvement of every culty and every human institution.

Without the assistance of correct charts, the study of the best geographical treatises would be useless. There are an infinite number of atlasses, of charts both general and particular. Different atlasses have appeared in different countries more or less complete. Most of these works have been successful, and they deserve it in many respects: but that which we now publish shall be the most complete work in this department which has hitherto appeared.

No expense has been spared to accomplish this object: our commercial relations have afforded us the greatest facilities for obtaining from the different parts of the world the best charts, voyages, treatises of geography, mineralogy, geology, etc.; the most valuable and correct works and of the greatest authority have been collected for this purpose.

Several years of continued exertion and of strict investigation have been employed, and considerable expenditure incurred; in fact, all means have been employed to give our Atlas the highest degree of perfection. The greatest care will be applied to render the physical, political, statistical and mineralogical notices as precise and exact as possible: it shall be our utmost effort to leave no part of our task unaccomplished, to justify completely the expectation of our subscribers. Such is the object we have proposed, not from the mere motive of interest, but rather from the more liberal sentiment of public utillty. The desire of attaching our name to a great and useful enterprise has stimulated us in the midst of numerous obstacles which, we hope, have been surmounted by our zeal, perseverance and industry. Our most grateful recompense will be in the success we may obtain, and particularly in the suffrages of our compatriots, who are competent judges, holding a first rank amongst the nations of Europe by their industry, manufactures and commercial and territorial wealth.

Most of the crowned heads of Europe have given to this undertaking their patronage: we flatter ourselves that the English nation, so ready to encourage all works which tend to promote and adorn the age, will not refuse a portion of that favor which has so powerfully contributed in every time to the extension of geographical discovery.

By giving the conical projection to this work we are desirous to procure to our subscribers, by the re-union of different charts, one globe of 23 feet 10 inches 6 lines of France, or 7 metres 775 mill. of diameter; and by that means, all the maps will be on the same scale.

The atlas is divided into six parts: namely, Europe, Asia, Africa, the two Americas, and Austral Asia: each, part has an index chart which serves as a table.

Each map bears the designation of the country which it represents, and on each side of that title will be specified the divisions and the number of the maps.

To avoid too great a number of charts, various groups of islands shall be given upon one sheet.

Such of our subscribers as desire to form a globe by the union of our maps, are requested to intimate their intention, and all the necessary sheets to cover the surface of a globe of the above diameter shall be delivered to them.

The work, which consists of forty livraisons, is completed, and we venture to flatter ourselves to have justified by the correct execution the engagement which we have formed, and the favorable reception of our subscribers.

Those who desire to possess our atlas are requested to signify the number of livraisons which they desire to receive monthly, which should not however be less than two.

The following is the criticism upon Mr. Ellet's "Laws of Trade," referred to in our last number. The article had been overlooked, but as a correspondent has noticed it we insert it.

ON THE THEORY OF TOLLS UPON CANALS AND RAILROADS.—SIR—As I am aware that Mr. Ellet's remarks on Canal and Railway Tolls, extracted in your Journal for September, have attracted some attention, and have been received as sound and judicious principles by some persons, who are in a position which enables them to carry out these principles into practical operation, I beg to offer a few observations, with the view of pointing out what I conceive to be erroneous in Mr. Ellet's statement.

Mr. Ellet's object is, so to regulate the charge of toll upon a canal or railway, as that every part of the country through which the line passes, near or remote, may derive from the improved mode of conveyance the same advantage, an equal share of trade. And he contends that this cannot be effected by the system of tolls that generally prevails, namely, a fixed mileage, or a certain rate per ton per mile; and he therefore recommends the adoption of the directly opposite method, viz., that the lowest charge should be levied on the trade that is brought from the greatest distance, and increasing gradually as we approach nearer to the mart or place of consumption, that the heaviest toll should be charged on that which comes the shortest distance. And Mr. Ellet then proceeds to show that this plan would produce the largest trade, (that is, would command the largest extent of country,) and the greatest amount of revenue.

Now all Mr. Ellet's argument depends upon one little assumption which he quietly introduces, without remark or explanation, quite unconscious that it contains the grossest fallacy. The market price of any commodity at the place of consumption may be said to be fixed, (for our present purpose,) and, in order to obtain a sale for this commodity brought by the canal or railway, the cost of production and the expense of conveyance must not exceed the fixed market price. Mr. Ellet takes for granted that *the cost of production* is fixed also, and on this rests the whole theory of tolls "Let us also assume that the cost of producing this article (lumber) is 6 dollars per ton," and the market price being fixed (10 dollars,) he consequently assumes that the extreme cost of carriage which the article can bear, so as to be sold in the market, is fixed too, that it must not exceed 4 dollars in the instance given. But he assumes also, and it follows in like manner from the preceeding assumption, that *the cost of production is fixed*, that the article can always bear this fixed charge of 4 dollars, that whether the

commodity be brought from near or far, whether it is carried 100 or 400 miles, it can always bear the full charge of 4 dollars for carriage, and cannot, in any afford more. And on this assumption Mr. Ellet builds his theory,—that as the cost of carriage consists of two parts, the actuul expense of conveyance, including the maintenance of the canal or railway, called *the freight*, and the profit of the canal proprietors, called *toll ;* and as the freight must necessarily be directly proportional to the distance, the toll (their sum being fixed) should be inversely proportioned thereto.

Even were this principle correct in theory, it would in practice be exceedingly unjust, and therefore injurious. For nothing can be more unreasonable than that the trade which passes along the canal but 50 miles, should pay three times as much toll as that which comes 150 miles, thus paying actually *nine times* its due proportion. Let it be observed also that Mr. Ellet's system is one that can be fully carried out only on such a canal or railway, as has to sustain no competition with common roads. On the latter the charges of conveyance will always be directly proportioned to the distance, and being lowest for the nearest parts, will of course successfully compete with the canal or railway, whose toll is *here* the highest. The maximum charge for conveyance being 4 dollars, and supposing with Mr. Ellet that land carriage is five-fold more expensive than the 'improvement,' it will according to the scale given by him, be cheaper than the canal for the first 40 miles, (one-tenth of its whole length,) and from so much of the country, therefore the canal will derive no trade. With us the proportion of the cost of land and canal carriage is much nearer, perhaps greater than two to one ; and the portion of country commanded by the superior cheapness of land carriage under Mr. Ellet's system of tolls, will be proportionately larger. Wherever there is the competition of another conveyance, on which the charges are made according to the distance, the inverse system of toll will be impracticable.

Leaving, therefore, for the present, the practical objections to Mr. Ellet's proposed system, I turn again to that which forms the basis of his whole theory, and which I conceive to be a most fallacious assumption. I am indeed surprised that any one writing upon such a subject, who ought to have some acquaintance with the principles of Political Economy, should hazard, or should carelessly make, an assumption so opposed to the mere elements of that science, as well as to ordinary experience. So far from *the cost of production* of any article being a fixed sum, throughout an extensive district of country, it is dependant upon, and varies exceedingly with, a great many circumstances. Every one knows that there is difference of prices in many markets throughout the kingdom, and the price *at the place of production* is, *generally*, the actual cost of production, added to the usual profits. For reasons which will be noticed hereafter, the cost of production, and consequently, prices differ less in an improved country like England, than in one possessed of fewer artificial advantages, such as America or Ireland. But the fact is notorious to every one, that differences do exist in the expenses of production, at different places, of commodities of the same quality, and equal value at the place of consumption.

The cost of production is made chiefly of rent, the wages of labor, and the profits of producer, (and, in manufactures, of the price of the raw material.) *Rent* is well known to vary exceedingly in different parts of the country, even for lands of the same kind, and equal fertility. *Wages* differ too, not only between the manufacturing and agricultural districts, but also between different districts engaged in the same occupations. Profits differ likewise, but being nearly in a fixed proportion to the total cost, they need not be considered separately. As, then, the component parts of

the cost of production thus vary throughout the country, their sum, the total cost cannot be said to be fixed. Yet Mr. Ellet seems to have forgotten these facts, palpable as they are to every man's observation

There are, however, certain articles whose value is very small, and the cost of production of which consists merely of the wages of the labor employed upon it; and this labor being of the coarsest kind, its wages vary but little. Of such commodities the expense of production cannot differ much, and may be said to be fixed. Such are stone, lime, and, in a wooded country like America, timber, and perhaps coal, ores, &c. It is to such products Mr. Ellet chiefly applies his theory, but he does not confine it to them. He intimates that some other principles come into operation with reference to the more valuable articles of trade. But as I have not seen his observations on that part of the subject, and as it appears to me that his principle, if correct, must be equally applicable to every branch of trade, and as I know that it has been so interpreted and applied by some of his readers, I have discussed the subject generally, endeavoring to refute the theory in its application to either division of canal trade. In certain cases, then, it would appear that Mr. Ellet's assumption is correct, that the cost of production is fixed (or nearly so). But it so happens, that in these instances, our author's system of tolls would be altogether impracticable. The commodities are of such little value as to be scarce worth removing, unless at a very small cost; they cannot, in general, be brought from a distance, the necessary charge for freight, even if there be no toll, acting as a prohibition; and to have any trade, even from the nearest places, you must levy only the lowest rate of toll. Thus on the Irish Grand Canal the toll on stone is 6*d.* per ton, and on manure 4*d.* per ton for any distance,—because at higher rates they would scarcely be carried at all. And here, it is evident, there is no room for graduation according to Mr. Ellet's plan.

But resuming the considertion of the cost of production, where it is not fixed, let us examine into the causes of the differences that exist; why rent is high in one district, and low in another, and why wages vary so much as they are found to do in different parts of the country. Of course they all depend upon the economical principle of the relation of supply and demand. But in the same country, all parts of which are subject to the same laws and conditions of trade, and all contribute to the supply of the same great market, this relation between the supply and demand, that is the different values of rent and wages in the various parts of this district, depends mostly upon their respective distances from the place of consumption, and the facilities of conveyance thither. Near a large town, rent and wages, and consequently the cost of production, are high, because there the great demand can be most easily supplied, and with very little expense for carriage. Farther off, as the cost of conveying the products to the markets increase with the distance, both rent and wages are lower. And if a canal or railroad be made into the country, as it cheapens the cost of conveyance and thereby facilitates its supplying the market, it raises rent and wages or the cost of local production. Thus the true state of the case is very different from Mr. Ellet's theory. The cost of production is not fixed; it is found to depend on the charges for conveyance, varying inversely with them (not in the same ratio,) that is, with the distance Of course I speak here of the natural charge for conveyance, which consists of *freight* only and is always proportionate to the distance. Such is the cost of carriage upon common roads, and as these are generally the first modes of conveyance, and the most universal, it is by the principles and circumstances that relate to them the cost of production is generally governed. In England the facilities for transport are so great, and so equally diffused throughout

every part of the country, that the difference in the cost of production in different places is small, as I before mentioned. But in countries where the improved methods of conveyance are few, the difference of price, or the cost of production, at places at unequal distances from the market, or not having the same facilities, is often very striking. In Ireland, the price of potatoes, for instnace, is frequently found to differ to an astonishing degree, in various parts more or less remote from the large towns; and the only cause appears to be the expense of carriage, which being in proportion to the distance, increases or diminishes the cost of production and the facility of removal.

If then, the cost of production is found to vary, and inversely with the distance, the difference between it and the market price is not fixed, but varies directly with the distance; and the total sum which the commodity will bear as the cost of conveyance to the market is a varying quantity, increasing with the distance. The freight, one of its parts, is proportioned to the distance, and the other portion, the toll, should also, in general, be regulated by the same proportion. There are, of course, many circumstances which modify this law, at least in practice; but looking at the abstract question, I think that the theory of tolls, which the principles of economy and the laws that govern the relations of value and price indicate, is the simple, natural, and just system of charging according to the distance, in proportion to the benefit conferred, or to "the value given."

This is not only the true theory, but it is also the only system that is practicable, wherever there is competition of common roads; it is easy to show that, in all cases, it would be the most profitable system also,—the most productive of revenue to the proprietors of the canal or railway; and at the same time the most impartial, and the most equally advantageous to every part of the country. Each district has its own advantages, in which it is superior to the others, and, under a natural system, its facilities for production and transport are proportioned duly to its means; while the retrograde principle must have the effect of encouraging the remoter districts, and depressing the nearer,—by destroying the natural and equable balance, which prevails in the social commonwealth.

I cannot trespass on your space, Sir, by entering on the proofs that the natural system is also the most productive; neither could I do so without introducing diagrams, which would be found to differ very much indeed from those of Mr. Ellet. I shall add, that I hold the true and most effectual mode of gaining for a canal or railroad the largest amount of trade and revenue to be MODERATE TOLLS, charged fairly according to the distance. I am convinced that the charges upon most canals and railways are much too high; that considerably lower rates would greatly increase their prosperity, and add vastly to the resources and commercial facilities of the country. Wherever the experiment of reduction has been tried, it has proved successful, in augmenting the trade and its profits; and I have no doubt that soon the proprietors of many public works will be compelled, for their own sakes, to resort to such measures; and it is, therefore, of much importance that the principles of "the theory of tolls" should be clearly understood; and conceiving that those advocated by Mr. Ellet are fallacious, unjust, and injurious, I have endeavored to refute them,—and regret that the task has been so feebly and hastily performed.

C. E. B.

ATLANTIC AND PACIFIC COMMUNICATION.—Not doubting that many of our readers will be interested by the perusal of the following private letter to a gentleman high in office, from the person through whose instrumen-

tality steam navigation has recently been begun in the Pacific, we cheerfully give it room, and trust that its suggestions in regard to the importance to the United States especially, of a communication between the Atlantic and Pacific oceans across the Isthmus of Panama will be marked and weighed by our statesmen and citizens. We may add that this letter shows the wakefulness and untiring industry with which all practicable means are exerted to extend the political and commercial interests of England. Our readers no doubt remember that this Pacific Steamboat Company is under the patronage of the British Government. Does it not behoove us to open our eyes to what is taking place in so many quarters of the Globe?—*National Intelligencer.*

TALCAHUANO, MARCH 20, 1841.

MY DEAR SIR: As you did me the honor to ask me to write to you, I avail myself of the present moment to do so; and as you have always manifested so much interest in my plans, I will relate to you some account of my success since my arrival in the Pacific.

The first steamers, the "Peru" and "Chili," of 700 tons and nearly 200 horse power, reached this port after a voyage of 55 days at sea from London, passing through the straits of Magellan, only occupying thirty hours from sea to sea, affording thus another proof of the victorious power of steam. Although encountering at times severe weather, not the slightest accident occurred to either ship or machinery. The combination of steaming and sailing was beautifully demonstrated, and the speed of the ships under canvass alone, with merely a section of the paddle floats taken off was fully equal to the fastest ships.

Our steam operations commenced here under the most brilliant auspices. Nothing could exceed the interest manifested by the inhabitans. I first commenced on a line of coast of fourteen hundred and fifty miles, embracing no less than eleven ports of importance, including Lima and Valparaiso. Such are the facilities afforded by the mildness of the sea, the boldness of the coast, the ease in which the ports are entered, that we accompished the voyage in its full extent within two or three hours, and to the minor and nearer ports in less period, Perhaps no part of the world whose shores are bounded by any sea offers such decided advantages for "steam" as this, and certainly no part of the world requires it more: voyages which were usually of twenty to thirty days are accomplished by the steamers in forty hours and voyages of fifteen days are reduced to twenty-four hours.

As proper measures were not taken to secure a supply of coal from England, I have been obliged to stop until such supplies were forthcoming. Encouraged with the hope of meeting coal in the south of Chili, adapted to steam purposes, I explored the country as far as Chiloe, where I found coal, but that which offered most advantages was in the bay of Talcahuano; no mines had hitherto been worked, but several cargoes had been taken superficially; here I commenced my labors. Without practical knowledge or the aid of science, I have opened no less than seven mines—have found the material necessary for our purposes, and am now engaged taking out about fourteen tons per day, at an expense of two dollars per ton placed on board the steamer; its quality is in the proportion of sixteen tons to thirteen tons of English coal. I am now in hopes of finding another and lower stratum, and with this view I am sinking two shafts which give strong indications of better coal. If I succeed, I feel confident that I shall find coal fully equal to New Castle, if we draw a comparison between the first and second stratum, and that the quantity will be sufficientto supply all the steamers which may be required on this coast for any period. This discovery of steam coal will, perhaps, be considered

one of the most important events in the history of this country. It is rather a singular coincidence that the coal discovered both on the eastern and western sides of the Isthmus of Panama is of precisely the same character as the coal of Talcahuano. I have sent to the Isthmus for some tons of this coal, and hope yet to derive our supplies from that source, so far as may be required for that portion of our steaming.

The line of steam communication I propose to extend immediately as far as Guayaquil, and for the present the intercourse from thence will be by means of sailing packets once in twenty days.

The western line of packets will, I hope, be soon commenced to Australasia. I feel the greatest anxiety to see this intercourse established. For America I consider it as one of the most important points; it will make her the stepping stone between Europe and the Eastern Archipelago. The Australian Colonies of England will assume a position novel and of infinite value to their progress in civilization; the Anglo-Saxon race will occupy nearly all the vast inhabitable space embraced in their widely extended branches, and the tide of intercourse will thus reach the shores of Japan and China, and be placed in the same position as it regards our western shores of the Pacific as Europe occupies as it regards our Atlantic States.

I consider the establishment of steam navigation in the Pacific as the poineer of these great events; the barrier that divides the two seas or oceans will soon disappear. I have occular evidence that the junction can be effected with infinitely less difficulty than is imagined. I passed over the Isthmus on my return to this country without overcoming a height of forty feet, and a distance of twenty-eight miles. This is but a barrier of straw when compared to the vast results which will be produced. I sincerely hope that one of the first acts of the Government will be to investigate this, to us more than to any other nation in the world, all-important matter. Our statesmen cannot but look forward to the period when our western frontier will reach the Pacific, and when the population of the U. States reaches that coast, of what infinite value will a water communication through the Isthmus of Panama be to us. It may perhaps be thought too speculative to indulge in such views, but when I reflect that twenty years only, the time which I have resided on this coast, has witnessed one of the most important political and commercial revolutions which have ever taken place, I cannot but view the period of these great changes to which I have referred, as much nearer than we imagine.

I have again written a long letter, perhaps a repetition in some measure of my last, which I must beg you to pardon, and allow me to subscribe.

Your most obedient servant.

PAPYROGRAPHY.—This is a new invention for reproducing drawings, manuscripts, and all kinds of designs to an unlimited extent, and by means much cheaper than at present known. This process, which is called by M. de Manne, the inventor, *Papyrography*, is very fully noticed in a late number of the *Moniteur*, from which we abridge the following particulars. The mode by which M. de Manne produces designs, &c., on paper, is thus described. After having, by means of his prepared metallic ink, traced the drawing on common writing paper, he contrives, by an operation which he at present keeps secret, to make the lines rise from the paper in relief, and become extremely hard and durable. He fixes this matrix on a plate of metal, on which he then places the paper that is to receive the impression. Over the paper he places a piece of silk, and passes it under the roller of a copper-plate press; when the characters and lines on the manuscripts or

drawing are reproduced, stamped in on the paper. These designs thus fixed on the plates are hard enough to allow of a greater number of impressions being taken without injury to them. The part of the invention, which consists in obtaining plates of metal cast from the matrix afforded by the drawing on the paper, is considered by the committee of the Society of Arts of Mulhausen, who were appointed to examine it, as of still greater importance than any other. By this engraving on paper, say the committee, may be obtained impressions fully equal to what can be had from wood engravings; by this means, therefore, works which require illustrations may be printed with great cheapness. In engravings on wood, the design and the subsequent cutting are necessary, but by the papyrographic method, the design is the only expense; and it will produce without end as many engraved plates and impressions as may be required, at a cost one half of that of the ordinary process; and with a precision equal to that of the original drawing. As M. de Manne conducted his experiments at Rouen, where there was no skilful metal founders, he labored under great disadvantage in his attempts to bring his invention to perfection, but the specimens he sent to the committee were sufficient to convince them that his plan was capable of answering all that he stated. Some of the specimens sent to the committee presented the designs, and the printed copies from them in relief to the height of from two to three millimetres, obtained solely from the matrix traced on paper. The committee propose to extend the invention to the printing of woven fabrics and paper. M. de Manne sent some plates prepared for this object, but owing to the disadvantages under which he labored, the plates were not so perfectly cast as they ought to have been, to produce the desired effect. The defect, however, he ascribes entirely to the unskiful manner in which the Rouen founders took the cast of his matrices; for not venturing to trust them with the paper moulds, he took casts of them in plaster; from which the metal plates were afterwards cast. It is to this circumstance that M. de Manne attributes the failure of his experiment, as it was difficult to take the cast in plaster from the paper so as to preserve the sharpness of the outline. He says he is certain of the success of his process as applied to the printing of papers and calicoes, but want of means with him, as with many other inventors, prevents him from taking out patents, or from carrying the ivention into operation. The committee report that it seems to them highly probable that if the inventor was placed in more favourable circumstances, he would arrive at remarkable and very useful results. In conclusion they recommend the society to grant him a silver medal, though the invention is not of a nature within their usual subjects for prizes.—*Inventors Advocate.*

James Prinsep, whose brilliant career of research and discovery has been closed by a premature death in the flower of his age, was Principal Assay Master, first of the mint at Benares, and secondly of that of Calcutta, where he succeeded Prof. Wilson in 1833; he was a young man of great energy of character, of the most indefatigable industry, and of very extraordinary accomplishments; he was an excellent assayist and analytical chemist, and well acquainted with almost every department of physical science; a draughtsman, an engraver, an architect, and an engineer; a good oriental scholar, and one of the most profound and learned oriental medallists of his age. In 1828, he communicated to the Royal Society a paper "On the Measurement of High Temperatures," in which he described among other ingenious contrivances for ascertaining the order, though not the degree, of high temperatures, an air thermometer applicable for this purpose, and determined by means of it, probably much more ac-

curately than heretofore, the temperature at which silver enters into fusion. His activity whilst resident at Benares has more the air of romance than reality. He designed and built a mint, and other edifices; he repaired the minarets of the great mosque of Aurengzebe, which threatened destruction to the neighboring houses; he drained the city, and made a statistical survey of it, and illustrated by his own beautiful drawings and lithographs, the most remarkable objects which the city and its neighborhood contains; he made a series of experimental researches on the depression of the wet-bulb hygrometer; he determined, from his own experiments, the values of the principal coins of the East, and formed tables of Indian metrology and numismatics, and of the chronology of the Indian systems, and of the genealogies of Indian dynasties, which possess the highest authority and value. When transferred to Calcutta, he became the projector and editor of the "Journal of the Asiatic Society of Bengal," a very voluminous publication, to which he contributed more than one hundred articles on a vast variety of subjects, but more particularly on Indian coins and Indian palæography. He first succeeded in deciphering the legends which appear on the reverses of the Greek Bactrian coins, on the ancient coins of Surat, and on those of the Hindoo princes of Labore and their Mahomedan successors, and formed alphabets of them, by which they can now be readily perused. He traced the varieties of the Devanagari alphabet of Sanscrit on the temples and columns of Upper India to a date anterior to the third century before Christ, and was enabled to read on the rocks of Cuttock and Gujaret the names of Antiochus and Ptolemy, and the record of the intercourse of an Indian monarch with the neighbouring princes of Persia and Egypt, he ascertained that, at the period of Alexander's conquests, India was under the sway of Boudhist sovereigns and Boudhist institutions, and that the earliest monarchs of India are not associated with a Brahminical creed or dynasty. These discoveries, which throw a perfectly new and unexpected light upon Indian history and chronology, and which furnish, in fact, a satisfactory outline of the history of India, from the invasion of Alexander to that of Mohammed Ghori, a period of fifteen centuries are only second in interest and importance, and we may add likewise in difficulty, to those of Champollion with respect to the succession of dynasties in ancient Egypt. These severe and incessant labors, in the enervating climate of India, though borne for many years with little apparent inconvenience or effect, finally undermined his constitution; and he was at last compelled to relinquish all his occupations, and to seek for the restoration of his health in rest and a change of scene. He arrived in England on the 9th of January last; but the powers both of his body and mind seem to have been altogether worn out and exhausted; and after lingering for a few months, he died on the 22d of April last, in the 41st year of his age. The cause of literature and archæology in the East could not have sustained a severer loss.

Lieut. Hunter's invention. The Germ.—We notice with great gatification the arrival at the navy yard in this city, of the experimental steam-vessel of lieut. Hunter in thirty two hours from Norfolk. The Germ, as she is most appropriately named, is propelled by lieut. Hunter's submerged propellers, of which our readers have before seen some notice taken in our columns.

We cannot too highly estimate the value of such an invention as this and of that of Ericsson, recently tested on the ship Neptune on her passage outward to Havana and homewards. Should they prove successful as we have for some time past believed they would, their value to the nation as a

means of extinguishing effectually the whole steam armament of the ordinary construction of any nation which may attack us, will be beyond computation.

Too much credit cannot be given to the Secretary of the navy for the prompt manner in which he has sought to iecure to the country the benefits of these inventions, by sending an experienced naval constrctor (Mr. Rhodes) to New York immediately after the return there of the Neptune, that he might possess himself of the facts relative to the operations of Ericson's propellers during her trip, and by the means adopted to bring into the public service the invention of lieut. Hunter.

The Germ performed the trip from Gosport yard to Washington in 32 hours, a distance of two hundred and forty miles, or thereabouts—and making at times nine miles per hour.

This is but a *germ*, it is believed, of what she can do. The invention, it is beleived, will also prove invaluable to the inland commerce of the country, as no greater *wake* or *swell* is produced by the action of this propeller than by the motion of an ordinary boat, propelled by sails or otherwise, at the same speed.

The Germ is believed to be the smallest steam vesesl eversent to sea, being of but 9 feet beam at the water line, and of 50 feet in length, drawing but 2 fcet water, and possessing 6 horse power. Her propellers are 5 feet in diameter, superficies of each paddle one half a square foot.

In passing through Hampton Roads agaist a heavy head sea and in the face of a strong N. E. blow, her ingine performed the usual number of revolutions, and worked as steadily as in smooth water, giving conclusive proof of the safety and fit adaptation of these propellers for sea navigation.

The well established tact, that the speed of a vessel is accelerated by an increased diameter of the paddle wheels, leaves no doubt that a vessel on lieut. Hunter's plan may be propelled as rapidly as one of equal size by the propellers now in common use.

This little steamer is indeed a "*germ*" of great promise. It was presented to the notice of the Hon. Secretary of the navy soon after he assumed the duties of office in March last, and by his characteristic discrimination, and promptness of action, he has, within the short period of three mohths, at trifling expense to the country, constructed and put in operation this vessel, and thereby practically tested this important invention.—*Madisonian.*

The Russian Musket.—A meeting of several military and scientific gentlemen took place at Chalk Farm, for the purpose of testing the comparative merits of the detonating musket, now about to be generally introduced into the British service, and that invented by the Baron Heurteloupe for the use of the Russian army. Though the day was wet and boisterous in the extreme, 160 rounds of ball catridge were fired from the Baron's gun in an inconceivable short space of time, without a single failure or hangfire; and, indeed from the formation of the peice itself, which has the lock placed under the barrel immediately before the trigger, and which is futher by a most ingenious contrivance, completely secured from the action of the weather, the priming being contained in a continuous thin flat metal tube, impervious to moisture, and enclosed in the stock of the gun itself, rain or wet can have no effect on the action of a musket so constructed. It is however the composition contained in this tube, and the simple manner in which it is acted uqon, that gives the invention its great superiority over all other fire arms now used. The tube in question, which is about eight inches long and about $\frac{1}{6}$ of an inch wide, cotains detonating powder sufficient for these,

primings, and is in the first place inserted in the body of stock, under the barrel.

A very simple mechanism causes the extremity of this tube to advance over a flat topped nipple and the cock which strikes it is so constructed as to cut from the tube that portion which lies over the nipple, and the hammer acting upon it almost simultaneously produces the discharge. Leaving out of the question the chemical merits of a composition which will admit of a part being cut off and exploded, without igniting the remainder of the contents of the tube, the mechanical merits of the gun as a military engine are extraordinary; it combines within itself all the *desiderata* of cheapness, strength, simplicity, certainty of fire in all weathers, and capacity for rapid execution, which are required in a soldier's weapon, and is as great an improvement over the common copper cap lock as that is over the old flint and steel principle. Many old officers have doubt that in a military point of view it is subject to many grave objections on the score of inconvenienc, to the soldier using it in wet weather, or with cold hands, from its liability to fall off and split when exploded, to the injury of the man standing next from its great insecurity from dampness, its chemical affinity for moisture, and its liability to be injured by hygrometric changes, not to mention its difficulty of management in the clumsy and awkward hands of a soldier acting in haste, under the excitement of fire. The whole of these drawbacks are said to be avoided in the Baron's invention, which, in the opinion of the military men present at the experiment, was by far the best adaptation of the detonating principle to the common musket that has yet been seen. We are informed that the gun in question has lately been submitted to the inspection of the Master General of the ordinance, with a view to its adoption in the British army. The recent experiments convince us that the Baron's invention can be applied to all fire arms, and it is without exception the greatest improvement yet accomplished.

Steam Pile Driver.— Messrs Pond, Higham & Co. the enterprising proprietors of the "Vulcan Iron Works" in this city have just completed a machine for driving piles which is to be sent out to Liverpool, England, from whence it was ordered by a company who have taken large contracts on the great Russian Railroad. This machine, which we saw in operation on Tuesday last, is worked by steam, and with half a dozen hands to manage it, is capable of performing the labor of two hundred men and twenty of the old fashioned pile drivers. We have not room to enter into a minute description of the manner in which it is constructed, and must therefore be content with saying, that it carries its own locomotive, sets up the piles drives them, and cuts them off at a proper grode, with a circular saw, thus preparing the road to recieve the rails as it progresses onward. It is a "yankee notion" which reflects great credit on the ingenuity and skill of the inventors and manufacturers, by whom it has been christened "*Brother Jonathan.*" It is most perfect in its action, and without doubt, will entirely supersede the pile drivers heretofore used in constructing railroads and docks in Europe, as it has already to a considerable extent in this country. —*Oneida Whig.*

The Frigate Essex.—The article on our Navy, in the Southern Review, detailing the enormous expenses of building and *repairing* our goverment ships, in these days, and the interminable lenth of time employed in their construction, reminded us of the building of the ship Essex, in this city, in 1798—'99. This frigate was built, as our readers are aware, by a subscription of our citizens, and loaned to the goverment. The Salem

Gazette, of October 1, 1799, says:—Such was the patriotic zeal with which our citizens were impressed, that in the short space of *six months* they contracted for the materials and equipment of a frigate of 22 guns, and had her completed yesterday for lauching. The chief part of her timber was standing six months, ago and yesterday she moved into her destined element."

We have no means of determining the exact cost of the Essex, and should be obliged, for information on that subject from any quarter. The whole amount of subscriptions, on the original lists, is $74,400.

Mr. Enos Briggs was the architect of the Essex. The sails were made by Messrs. Buffum & Howard, from duck which was manufactured here expressly for the purpose, by Mr. Daniel Rust. The cordage was manufactured by the late Capt. Jonathan Haraden, a distinguished private naval commander in the war of the Revolution.—*Salem Gaz.*

Accidents on Railways.—It it ascertained from, a late British puplication that the "the danger of loss of life, on average railroad trips, is about 1 to 4,000,000,"

In a report of the Utica and Schenectady railroad, company to the Legislislature, it is stated that for the four years and five months the company have been in existence, they have carried over their road 389,547 throngh passengers and 334,522 way passengers—(724,089 passengers, ending 31st Dec. 1840). It is not known that a single life has been lost during this period by the railroad, on this important throughfare.

The Great Western railroad in England, during the last 2 or 3 months, has run 29,200,000 miles, and carried 1,520,000 passengers, without any accident, fatal or otherwise, to a passenger from its opening. The Franklin Institute, after mentioning four other roads, states "Thus are added to our former hints from these five railways, only one of which is a large passenger line, 3,365,000 passengers carried on four only of the line, (29,575,000 miles,) without one fatal accident, and only 2 slight bruises fairly attributable to the railways; for we repudiate all accidents which the drunken or head strong ways of men violating order and rules, bring upon themselves. The account therefore, will stand thus:—about 256,000,000 of miles were run, and 14,000,000 of person carried, with qnly two fatal accidents upon the railway system.

Fossil Remains in Lenoir County, N. C.—Extract of a letter to the editors from John Limber, dated Strabane. Lenoir county, N, C., June 10th, 1839. This location was discovered by Mr. Richard Rouse, the owner of the land, when digging a dike to drain a bog. The location is near the snmmit level between the Neuse and North East rivers. It is on a branch of the Neuse, three miles from it and at least one hundred feet above it, and about sixty miles west of Pamlico sound.

The upper stratum of earth is about three feet in depth, and is the common soil of the region, viz. a fine white sand and vegetable matter. The next stratum is of about the same depth, and is composed almost entirely of *shells*, of a great variety of species; and a still greater variety of sizes. These are cast together in every manner, lying in every position, and shells in shells. Next is a stratum of yellowish clay only a few inches in depth, and containing bones of enormous size. Below this is a stratum of black clay impenetrable by water; depth unknown. This also contains a few bones and in a more perfect state.

On the first of June I visited this location in company with Mr. Rouse, and in two hours we found bones enough for a load to transport home in our arms. Among them was a piece of a rib-bone about two feet in length,

which measures three and a half inches in width, and about two and a half in thickness. We also found a tooth of a triangular shape, which is four inches across the base, and about five in length. Mr. Rouse informed me that he had found a part of a tooth, which must have belonged to one four times as large as the one I found: and that he had found a *vertebra* eight inches in diameter. Those bones are found in all the strata, but the largest are the lowest. Of the quantity of shells it may not be amiss to say, that there are millions of bushels, and they are beginning to be used for manure.

REPORT OF THE DIRECTORS OF THE BOSTON AND WORCESTER RAILROAD CORPORATION TO THE STOCKHOLDERS, June 7, 1841.

The directors have the satisfaction of stating, that the operations of the railroad, for the last year, have been carried on as successfully, and its prospects at the present time are as favorable, as at any period since its establishment. The passenger and freight trains, with a few exceptions, have run with a regularity which leaves little to be desired, and all the reasonable expectations of the public are believed to have been fully answered. In the amount of travelling and freight transportation, there has been a moderate increase, in comparison with that of preceding years, and the prospect of a further increase has been at no time more favorable. The condition of the road, of the depot buildings, except those in Boston, and of the motive power, is better than it has been at any former period.

Several important improvements, however, remain to be accomplished, and extensive preparations have been made for effecting them. The prospect of the early completion of the Western railroad, and the anticipated increase of business, on the accomplishment of that event, as well as the want of further room for the business of our own road, have led the directors to adopt measures for a large increase of the depot accommodations in the south cove, (in pursuance of a design which has been before announced,) both in the passenger and freight departments, and also for a further extension of the second track. By the union of the Western and Norwich railroad trains, with those running only to Worcester, the length of trains is frequently greater than can be accommodated in the present passenger building. For this reason, the plan has been adopted, and is now in progress of execution, of making a considerable enlargement of this building. Extensive buildings have also been erected, in the course of the last season for the storage of the increased number of passenger cars.

In the last annual report, it was stated that a negotiation which had been opened with the south cove corporation, for the purchase of land on the east side of Lincoln st., to enable us to remove the railroad track from a great part of Lincoln st., and to establish the depot buildings on the easterly side of that street, had failed. Since that time, by various negotiations with individuals who had become purchasers of the lands of the cove, several purchases have been made by the directors, which have enabled them to attain substantially, though in a different mode, the objects which they had contemplated in those negotiations. The passenger building is retained on the westerly side of Lincoln st., but the track is removed from a great part of the street, by being continued for some distance on the west side of it, and several lots of land have been purchased on the easterly side of the street, for the erection of an extensive warehouse for the reception of merchandize and the storage of freight cars. This building will be in the immediate vicinity of the buildings already erected for receiving trains of cars, and also with the engine house, machine shop, and wharf.

Further wharf room has also been procured for the landing of wood,

and further space for the erection of wood sheds. These arrangements involve a heavy expenditure in the purchase of land, and the erection of buildings, but the directors deem it important to provide amply at the present time, while the lands could be purchased at reasonable rates, all the accommodation likely to be required for many years to come, and to leave no room for just complaint of the insufficiency of the accommodation. The building proposed to be erected for the reception of merchandize, will be four hundred and fifty feet in length, and one hundred and twenty in breadth, and adapted to the reception of merchandize and trains of freight cars. On the land east of Utica st., it is proposed to erect wood sheds sufficient to receive all the fuel which it will be deemed expedient to keep on hand, for such period as is necessary to give it a proper seasoning for use.

The experience of the advantage derived from that portion of the second track which is already laid, and the anticipation of a greater necessity for it when the line of railroad shall be extended to Albany, have induced the directors to take measures for extending that track during the present summer, a further distance of twelve miles, reaching from Needham to Natick and from Hopkinton to Westborough. Care has been taken to take advantage, as far as possible, of the experience which has been acquired on the various railroads already in operation, to adopt a form of rail and chairs, as well as a method of laying the rails, which will give the greatest practicable degree of smoothness, firmness and durability to the track. Considerable progress has been already made in the preparation for laying this track, and a part of the iron, which proves to be of excellent quality, has arrived from Liverpool.

These additional works will render necessary a further increase of the capital stock of the corporation. In conformity with the vote of the stockholders passed at their last meeting, the directors applied to the legislature at the last session, for an act authorising the creation of a further capital stock, which act they now lay before the stockholders for their acceptance. They recommend to the stockholders the creation of three thousand additional shares, which they compute will be sufficient to meet the expenditures proposed to be made the present season. The additional act thus obtained, besides authorizing an increase of capital, also authorizes the directors to take any land which may be necessary for widening the track, not exceeding five rods in width, in the same manner as they were authorized to do on the original laying out of the road. This authority may prove useful, in admitting of the widening of the road in certain places, where a wider space for the deposite of snow is found desirable.

It becomes our duty in recounting the principal transactions upon the railroad of the current year, to allude to a disaster, which occurred a few days subsequent to the making of the last annual report, of a more serious nature than any which had occurred since the opening of the road, and the only one which has happened during that period, now seven years, by which any passenger has sustained any personal injury. We allude to the accidental and unexpected meeting, on the 17th of June last, of two trains of cars conveying passengers upon the same track, and the consequent violent collision, by which both engines and several cars were much shattered, and fifteen or twenty passengers were injured, several of them seriously. Fortunately, no lives were lost, and the directors have endeavored to make such satisfactory compensation, as the nature of the case admitted of, to the parties injured. An adjustment has been made, by mutual agreement, with all the parties who have claimed any compensation for injuries sustained, except two, which are yet unsettled. The accident happened in consequence of an attempt, on the occasion of an extraordinary

assembling of the population of the State at Worcester, to comply with the expectations of the public, and to afford a much greater degree of accommodation, than the ordinary means of the establishment were adapted to furnish. The demand for seats on that day was more than tenfold the number demanded on ordinary days, and under circumstances which would have occasioned serious disappointment to the applicants, if the demand had not been supplied. To meet this demand, required the organization of a new system of movements for the day, and the employment of agents, many of whom had not become familiar by practice, with the specific duties assigned to them. The system of arrangements made by the superintendent was judicious, sufficiently simple, and apparently safe and easy of execution. It so happened, however, that, in consequence of the overloading and consequent retardation of one of the trains proceeding to Worcester, it was not able to reach the Grafton station at the appointed time, and therefore according to instructions, should have waited at the next preceding station. A returning train arrived at Grafton at the appointed time, and not finding the upward train, it should have waited for a specified period, and then have proceeded with caution. Both the responsible conductors, from a misjudgment of their instructions, and under the impression that the other was to stop, proceeded at the usual speed, and thus produced the unfortunate collision, which, if either, or both had waited for the specified period, and then proceeded with caution, could not have occurred.

The error did not appear to be the result of rashness on the part of either but of want of judgment or due reflection for the moment, arising from the novelty of their situation, the exeitements of the occasion, and the rapidity with which their respective duties followed one another. Although these circumstances afforded great palliation for the error of the agents, in the judgment of the superintendent, in which the directors concurred, they did not excuse it, and they were both discharged from the service of the corporation. The directors were not able to perceive any defect in the system of arrangements, which it would have been practicable to avoid, unless by declining to afford that degree of accommodation which was expected from them by the public. This, of course, they would have declined, had they forseen any serious danger in the arrangements which were made, arrangements which were, in fact, as easy of execution as those of every day's service, with the exception of the want of practice, and familiarity with the routine of duty, on the part of the agents.

This accident, besides the immediate injury resulting from the collision, and the interruption of the two trains, disturbed the system of movements of the other trains for the rest of the day, and although those trains brought back to Boston several thousand passengers on that day and evening, a large number were disappointed. It also subjected the corporation to considerable pecuniary loss, in the sums which have been paid in damages to the parties injured, and in the injury to the engines and cars. Besides the wreck of the two engines which came in collision with each other, a third was disabled on the same day.

The present locomotive force of the corporation consists of thirteen engines. Four of these, built in England, and purchased before the railroad was opened to Worcester, after six or seven years' serviee, are nearly worn out, and they are besides of too light a construction to be adapted to our presetn use, in consequence of the increased weight of the trains since the opening of the Western and Norwich railroads, and the adoption of the heavy, long cars. These engines have, therefore, been but little relied upon for the last two years, for the ordinary passenger and freight service,

but they are yet of value for occasional use, and for service on the gravel trains, which are employed in repairs of the road. There are besides, nine efficient engines, one of which, the Yankee, is seven years old, and the others have been in service for different periods, from one to five years.

These engines were all purchased previous to the last annual meeting, and were described in the report of the first of June last, with the exception of one, which was purchased in consequence of the accident of June 17th, and was placed on the road in July.

In reference to this subject, it may be expected that the directors should take some notice of the report of a committee of the stockholders, appointed at the last annual meeting, which was presented at an adjourned meeting, and was referred to the consideration of this board. In that report, the committee undertook to assign the causes why the dividends of this company have not yet exceeded six per cent., a rate which, the say, appeared to them altogether too low, compared with the reasonable expectations of the stockholders, and the eligible position of the road, and which accordingly they imputed to mismanagement on the part of the directors. In prosecution of that undertaking, they went into a long detail of statements and arguments, to show the nature and extent of that mismanagement. They remark, "they have ascertained two causes which, in their opinion, account for the deficiency of dividends, viz. the great expense which, in the present state of the locomotive and depot departments, is incurred in transportation, and the important fact, that the route does not command the business of the country within the natural influence of the road and its branches." They go on to represent the locomotive establishment as entirely inefficient, the engines are described by them as of antiquated patterns, deficient in power, and decrepid for want of repairs, although, as they state, $35,000 had been expended in repairs since the 1st of January, 1838. They say that "the Worcester road is quite behind the age with respect to the power and capacity of its engines." Such was their impression of the inefficiency of the engines, that they make the following recommendation: "Your committee are persuaded, that at least six new engines are required immediately, and would recommend their immediate purchase, as most essential to the success of the road, and would also recommend that no attempts be made to repair most of the engines now in the infirmary, and that for the future, no new engines with crank axles, or mounted on four wheels only, be placed upon the road, and that two of the new engines should be freight engines of superior power."

In regard to these representations, the directors owe it to themselves and to the stockholders to say, that they are entirely disproved by the actual condition and the effectual and regular service of all the engines which have been in the employ of the corporation. The course pursued in the selection of engines, in reference to size and general construction, in the method of management, and the mode of making repairs, is similar to that adopted on the Providence and Lowell roads. In the arrangement of a machine shop, and other facilities for repairs, our establishment is believed not to be inferior to theirs, or those of other roads in the country. The committee themselves speak highly of the ability and intelligence of our machinist, under whose immediate direction all the repairs are made. It might be presumed, therefore, that there would be no very material difference in the cost of repairs of engines, in the different establishments, in proportion to the distance run by their respective engines, except such as might be called for by casualties to which all are liable. On reference to the annual returns made to the legislature by the other companies above named, it will be found that although there is a good deal of variance in

the repairs of different years, arising, probably, from casualties, the cost of repairs for engines and cars on the Worcester road, whether the comparison be made of the last year's return, or of the aggregate of all the returns for four successive years, does not exceed that on either of the other roads. The distance run annually on the Worcester road, is much greater than on either of the other two. In the year 1840, the distance run by locomotives with the passenger and freight trains alone, was 152,725 miles. The cost of repairs of engines, including that occasioned by extraordinary casualties was $10,815, and for engines and cars, $16,667. The distance run during this year on the Providence, and also on the Lowell road, was less by a quarter part, than on the Worcester road; and the cost of repairs of engines and cars on the former was $16,755, and on the Lowell, $14.455. These comparisons are not made for the purpose of claiming any superior skill or economy over those skilfully and judiciously conducted establishments, but simply for the purpose of rebutting the charge that we are behind the age in our system of management, and of showing that there is no extravagant or unusual expenditure in the repairs of our engines. A further comparison with the experience of other railroads in this country, and in England, if it were necessary to pursue the inquiry, would afford further proof to the same effect.

The degree of efficiency of several engines is easily tested by reference to the records of their daily performance. From these records a table has been prepared, and is annexed to this report, which shows the actual performance of the eight engines, which were employed in the passenger and freight service, during the twelve months ending on the 1st instant, and exhibiting also the cost of repairs upon each during the year, with the dates at which each engine was placed upon the road. The statement of repairs embraces in addition to those expenses which are charged specially to the several engines, an apportionment of the general expenses of the machine shop, which go into the aggregate cost of repairs, so as to exhibit as nearly as is practicable, not only the relative, but the entire cost of repairs of each of the engines.

It will be seen by reference to this statement, that the engine which has performed the most duty is the Meteor, built by the Locks and Canals Co., at Lowell, in 1839. She has run in the course of the year, 29,721 miles with a cost for repairs of $617. The performance in the preceding six months was somewhat greater. This whole distance was run at an average, and nearly uniform speed, of more than 20 miles an hour on the passenger trains, and some part of the time on the steamboat train. She is of the same pattern and size as the oldest engines which we have in use.

(To be continued.)

THE EASTERN MAILS,—ONCE MORE.

So much censure has been cast upon the Directors of the Rochester and Auburn railroad company, by some of the papers in this city, as well as in those at Batavia and Buffalo, because the Company would not convey the mails, when the Post Office Department had refused, or at least neglected to give them a contract for so doing—that we consider it due in justice to the parties, to give the following statement of H. B. Gibson, Esq., the President of the Company, to our readers. We copy it from the Ontario Repository of Wednesday. The Rochester paper alluded to by Mr, G, is the Evening Post—which has since, it is proper to add, withdrawn its charges against the company.

"CANANDAIGUA, July 6, 1841.

"SIR,—My attention has been called this morning to two newspaper articles—one in a Rochester, and the other in a Buffalo print—concerning the conduct of the Auburn and Rochester railroad company in respect to the transportation of the mails. In reference to these articles I have only to say that, so far as they reflect upon the company they are unjust, and I presume they would not have found a place in those journals had care been first taken to ascertain *facts.*

I am requested to furnish a statement of the facts in connection with this business, and comply with this request as fully as the short time before your paper goes to press will allow.

In the month of March last, the Auburn and Rochester railroad was so far advanced as to authorize the anticipation, that, by a vigorous prosecution of the work, it would be completed from Rochester to the Cayuga lake—certainly to Seneca Falls—in the early part of the present month, and to Auburn during the coming fall.

In view of this the company, in the latter part of March, despatched Mr. Higham, the Engineer of the road, to Washington, clothed with full authority to propose and contract on behalf of the company for transporting the United States mails between Auburn and Rochester for the next four years.

On reaching Washington, and stating his objects, Mr. Higham was informed by the head of the post office Department that he was not then in a situation to receive proposals from this company, and was requested to suspend making them, until the objections to making them at that time were removed, of which the company would be duly advised. The agent, therefore, left Washington, without closing a contract.

No communication was received by the company from the post office Department between this time and the 23d day of June. On that day the Executive Committee of the Board of Directors—having incidentally heard that the objection to receive proposals from this company was removed—instructed me to make a proposition to the Post Master general to carry the United States mail between Auburn and Rochester twice a day for eight months and once a day for four months in each year, for four years, at $14,000 per annum, being about $175 per mile (it being understood that that was the rate per mile paid for transporting the mails on the railroads between Utica and Auburn) the company to receive and deliver the mails at all the numerous post offices now established, or which might be established on tho route during the four years.

On the following day, the 24th of June, I addressed the Post Master General, transmitting this proposition. On the 26th—same month, I received a letter dated from the contract office of the department 22d June, and signed by S. R. Hobbie, stating that the Post Master General had come to the couclusion to offer $150 per mile for the daily and twice daily conveyance of the mails from *Canandaigua* to Rochester.

Immediately on receipt of Mr. Hobbie's letter, I answered it by referring him to the proposition of the company to transport the

mails from *Auburn* to Rochester, transmitted to the Post Master general on the 24th of June. To this letter I received the following answer:

POST OFFICE DEPARTMENT, CONTRACT OFFICE,
June 30, 1841.

Sir,—Your letter of the 26th inst. is received, your previous communications to the Post Master General being already on file.

"The amount offered in my letter of the 22d inst., is, I am instructed by the Post Master General to say, the highest compensation he can give upon route 1119. Route 1061, Auburn to Canandaigua, has been let to contract by J. M. Sherwood, Esq., at something short of $150 a mile per annum for the whole term.

Very respectfully your obed't serv't.
S. R. HOBBIE,
First Assistant P. M. G.

Henry B. Gibson, Esq.,
President of Auburn and Rochester railroad company, Route No. 1119 *is from Canandaigua to Rochester.*

The foregoing statement presents all the correspondence and negotiations between the Department and the company on the subject of transporting the mails. That the company is not now transporting them from Auburn to Canandaigua, is not owing to the demand of any extortionate or unreasonable price. No such demand has been made by the company. No response has ever been received from the department to the proposition to carry the mail from *Auburn* to Rochester, except by the information contained in Mr. Hobbie's letter, that the ronte from Auburn to Canandaigua was let to Mr. Sherwood for four years. The company has not been advised by the department whether the price proposed for carrying twice a day through the whole route, was acceptable or not. The difficulty, therefore, has not arisen out of any disagreement about price, but from the fact that the Canandaigua and Auburn route has been let to another.

The department has, it is true, made a distinct proposition to the company to transport the mails from *Canandaigua* to Rochester. But it must be obvious to every body that the company cannot make such a contract, and perform it, without such a detention of the travelling public as they would not, and ought not to submit to. The railroad is now in operution from Seneca Falls to Canandaigua, and will be finished through to Auburn in a few months. The mails will be brought from Albany to Auburn by railroad; on their arrival the Auburn and Rochester cars will receive the passengers and bring them in a few hours to Canandaigua, whilst a post coach will take the mails and bring them along the same route. Several hours detention would be necessary at Canandaigua for the coaches to arrive with the mails, so that the company could take them on to Rochester. Neither the interest of the public or the company will admit of such delay.

The company has done every thing in its power to agree with the department upon terms for carrying the mails *through the whole line of its road*, and if these efforts to accommodate the public and

promote its own interests have been unsuccessful, it is not the fault of the company.

As to the charge of illiberality so unjustly brought against the company, it may be better appreciated when the fact is known that they have transported the mails between Rochester and Canandaigua during the most of the time their road has been in operation, without asking or receiving any compensation whatever.

It is not my purpose to censure any one in connection with this business; the object of this communication being purely defensive and as called for by my official relation to the company.

HENRY B. GIBSON.

President of the Auburn and Rochester Railroad Company.

RAILROAD BETWEEN ROCHESTER AND LOCKPORT.

SIR:—I take the liberty, through your columns, to ask the public attention to a recent act of the legislature, authorising the Lockport and Niagara railroad Falls railroad company to extend their railroad from its eastern termination in Lockport to the city of Rochester, or to the village of Batavia, as the company may hereafter determine. The importance of this communication over one of the routes designated in the act, becomes sufficiently evident on even a slight examination of the subject. The propose l extension, on either route, will supply the last link in a continuous chain of railroads from Albany to Buffalo via. Niagara Falls, and from Lewiston, at which point the main current of Canada travel crosses the Niagara river, and which is destined to become the main line of communication with the immense region lying north of lake Erie and west of lake Huron.

Each of the proposed routes from Lockport, east, has its peculiar advantages. From Lockport to Batavia the ground is very passable, and will not exceed 30 miles, being about half the distance of the contemplated route to Rochester. A connection may thus be formed between the Lockport and Niagara Falls railroad and the Tonawanda railroad at its western termination in Batavia. If the citizens of Batavia, and the Tonnawanda railroad company who are now urging the extension of their route on a direct line from Batavia to Buffalo, will abandon that project, and unite with the Lockport and Niagara Falls railroad company in connecting those roads, by an extension from Batavia to Lockport, making this the main avenue of travel from Albany to Buffalo, there can be little doubt that the interests of both companies and the public convenience might be greatly promoted by such an union. It may indeed be objected that the route is more circuitous and the distance to Buffalo will be thereby increased about thirty miles. But this increased distance when measured with railroad speed, becomes a trifling matter, hardly worthy of serious consideration. To compensate the travelling public for the loss of an extra hour or two, they may gain a passing view of the falls of Niagara, and may enjoy a route of unequal beauty and interest. The advantages of a connection with Lockport, a town now containing a population of 6,000, rapidly increasing, are too obvious to be overlooked. Wheth-

er these considerations will lead to concert of action and unity of purpose between the two companies remains to be seen.

From Lockport to Rochester, two routes are presented, containing many attractive features with great and substantial advantages. One of these, is the route along the beautiful and celebrated ridge road, which has been admirably graded by the hand of nature. It is mainly a gravelly formation, of all others the best adapted to railroads.

Another and a shorter route may be found along the Erie canal, which is a water level (known as the Genesee level,) from Lockport to Rochester. It is doubted if a more favorable line of equal length can be found on the globe. The cost of grading over so level a surface will be trifling as compared with other railroads. The length of the road by this route may be less than sixty miles; and it secures a communication with Brockport, Holly, Albion, Knowlville, Medina, Middleport, and the numerous smaller villages with which the line of the canal is studded. Many citizens of those villages take a deep interest in the project, and offer to aid in its accomplishment. By this route a direct connection may be formed with the Auburn and Rochester railroad at Rochester, and a communication may be opened which cannot fail to become a favorite and crowded thoroughfare.

I intend on another occasion to pursue this subject, and to consider its importance in connection with the western and Canadian travel, and the probable income to be derived from the work as an investment of capital. The hundreds of passengers now passing daily on canal boats would alone be sufficient to furnish ample revnue for a railroad.

Measures have been taken by the Lockport and Niagara Falls railroad company, for the survey of each of the routes above referred to. Mr. Julius W. Adams, an able, experienced, and highly accomplished engineer, recently engaged on the Western railroad, has been engaged for this service and has already commenced the necessary explorations. He will proceed to complete the survey as speedily as practicable, when he will report upon the several routes and their comparative advantages in respect to facility and cheapness of construction.—*Lockport Democrat.*

The New Jersey Railroad, has declared a dividend of 3 per cent., payable on the 26th inst. As a proof of the revival of business intercourse in the community, and as a testimony, though not conclusive, in favor of the policy of reduced prices, in an active commercial society, we annex the following statistics, furnished us from the books of the company. The statement, it will be perceived, embraces the first six months of the years 1839, '40, and '41: and affords a comparative view of the travelling of the railroad, during those periods. We cannot forbear noticing with satisfaction the growing intercourse between our own towns and villages, which previous to the facilities now enjoyed, was almost as restricted and infrequent, as with foreigners. It is also satisfactory to observe

that the State receives from $8,000 to $10,000, in transit duties.—*Newark Daily Advertiser.*

STATEMENT of passengers carried on the New Jersey railroad for the first six months of the years 1839, 1840 and 1841.

1839—*January 1st to July 1st.*

Between New York and Newark,	- - -	72,675
" "	Elizabethtown, - -	4,581
" "	Rahway, - - -	7,320
" "	New Brunswick, - -	14,769
Between Newark and	Elizabethtown, - -	2,582
" "	Rahway, - - -	2,149
" "	New Brunswick, - -	1,947
Way passengers to and from places between Elizabethtown and New Brunswick,	- - - -	3,192
Total passengers,	- - - -	192,215

1840—*January 1st to July 1st.*

Between New York and Newark,	- - -	77,457
" "	Elizabethtown, - -	6,733
" "	Rahway, - - -	8,973
" "	New Brunswick, - -	14,091
Between Newark and	Elizabethtown, - -	4,475
" "	Rahway, - - -	1,682
" "	New Brunswick, - -	1,870
Way passengers to and from places between Elizabethtown and New Brunswick.	- - - -	2,723
Total passengers,	- - - -	118,004

1841—*January 1st to July 1st.*

Between New York and Newark,	- - -	123,966
" "	Elizabethtown, - -	11,674
" "	Rahway, - - -	9,750
" "	New Brunswick, - -	15,144
Between Newark and	Elizabethtown, - -	6,093
" "	Rahway, - - -	2,156
" "	New Brunswick, - -	2,452
Way passengers to and from places between Elizabethtown and New Brunswick,	- - - -	3,846
Total passengers,	- - - -	175,081

The number of passengers carried in the Philadelphia lines, for which a transit duty of 8 cents each, is paid to the State of New Jersey:

1839—January 1st to July 1st, - -	35,320
1840—January 1st to July 1st, - -	36,477
1841—January 1st to July 1st, - -	44,299

THE CENTRAL RAILROAD.—We learn that the company has contracted with an enterprizing and responsible citizen of Macon, for laying the superstructure on this road, from the Oconee to the Ocmulgee river, and furnishing all materials except iron, and that the contractor will soon enter on the performance of the work. The amount of this contract is about $80,000.

It will be recollected that the grading of the whole road to Ma-

con, was let, in December last, and we have the gratification to state, that all the contractors for grading are pushing on their work with spirit.

The whole road, therefore, is under contract, on terms entirely within the compass of the company, and nothing now remains to secure the completion of the road but the purchase of about 3,000 tons of track iron, which will cost the sum of $150,000. We believe, that the company will find no difficulty in obtaining a loan for this small amount, during the ensuing season of business; but even if times continue hard, we do not doubt that there are citizens of that section of Georgia, immediately interested in this great enterprise, who will subscribe the required sum.

We express with pride, the firm belief, that by the first day of January, 1843—the road will be in operation its whole extent, a distance of 190¼ miles. It was commenced in October, 1836, under a charter which allowed for its completion a period of eight years. The next crop will be transported from a point near Sandersville, distant 135 miles from this city.—*Savannah Georgian.*

Durable Railways.—This important desideratum in the construction of railroads, has at length been attained, so that not merely an "iron ribbed" road, but the entire superstructure of that material may now be considered as practicable. This improvement combines economy, durability, and beauty, and is the invention of Mr. J. Spaulding and Mr. Isherwood, practical engineers on the New York and Erie railroad. Two arches, of two feet each, of this invention, is now in use on the Ithaca and Oswego railroad, half a mile west of this village, over which the regular trains pass every day. It has also been subjected to severe tests, and a single arch sustained a pressure of more than twenty tons. We understand that a branch road from Factoryville, in this county, to the Pennsylvania line, four miles in length, is forthwith to be constructed on this plan, and the castings are now being made. This invention is of the greatest importance. It will produce an entire revolution in the construction of railroads, as it can be built cheaper than the common mode, and its durability is beyond computation. It will open a new market for the immense beds of ore with which our country abounds, and obviate the necessity, now unavoidable, of depending upon England for rails. All who have examined the piece in operation, are struck with its simplicity, beauty, and strength—its advantages are incalculable.—*Owego paper.*

Steam Bridge.—The St. Louis Argus describes the following: "A striking use of the steam engine has been adopted at Portsmouth, Missouri. It is a floating bridge, seventy feet long, and sixty feet wide, impelled by two engines of twenty horse power, and making the passage (2,200 feet) at the speed of about 350 feet a minute. The bridge draws, with all its machinery, but two feet. This capital invention will naturally supersede the awkward contrivances of bridges of boats on the great Europern rivers, and will not improbably obviate the formidable expense of building bridges, and must greatly facilitate communication in colonies and new settlements in every part of the world."